

30) $m = 2.20 \text{ kg}$ $E_g = mg \Delta h$
 $W = 25.0 \text{ J}$ $25 \text{ J} = (2.20 \text{ kg})(9.8 \text{ m/s}^2)(h_f - h_i)$
 $F_g = mg$
 $= (2.20 \text{ kg})(9.8 \text{ m/s}^2)$
 $= 21.56 \text{ N}$
 $\frac{25 \text{ J}}{21.56 \text{ N}} = d$
 $1.2 \text{ m} = h_f$

$W = Fd$
 $\frac{25 \text{ J}}{21.56 \text{ N}} = d$
 $1.2 \text{ m} = d$

31) $m = 46 \text{ kg}$ $E_g = mg \Delta h$
 $h_f = 5.25 \text{ m}$ $E_g = (46 \text{ kg})(9.8 \text{ m/s}^2)(5.25 \text{ m} - 0)$
 $h_i = 0 \text{ m}$ a) $E_g = 2.4 \times 10^3 \text{ J}$
 b) $W = 2.4 \times 10^3 \text{ J}$

32) $m = 2.50 \text{ kg}$
 $h_f = 65.2 \text{ cm} = 0.652 \text{ m}$ $E_g = mg \Delta h$
 $h_i = 0$ $E_g = (2.50 \text{ kg})(9.8 \text{ m/s}^2)(0.652 \text{ m})$
 $E_g = 1.6 \times 10^1 \text{ J}$

34)

11th
10th
9th
8th
7th
6th

 30.0m
 60m change each floor
 a) $E_g = mg \Delta h$
 $= (1.35 \times 10^3 \text{ kg})(9.8 \text{ m/s}^2)(120 \text{ m})$
 $= 158922 \text{ J}$

b) $E_g = mg \Delta h$
 $= mg(180 \text{ m})$

$$\textcircled{35} F = 50\text{N}$$

$$x = 0.095\text{m}$$

$$F = kx$$

$$k = F/x$$

$$= 50\text{N}/0.095\text{m}$$

$$= 5.3 \times 10^3 \text{N/m}$$

$$\textcircled{38} E_e = \frac{1}{2} k x^2 = \frac{1}{2} (35\text{N/m}) (0.24\text{m})^2$$

$$x = 24\text{cm} = 0.24\text{m}$$

$$K = 35\text{N/m}$$

$$E_e = \frac{1}{2} k x^2 = 1.008\text{J}$$

$$\textcircled{39} K = 48\text{N/m}$$

$$E_e = 2.2\text{J}$$

$$E_e = \frac{1}{2} k x^2$$

$$\sqrt{\frac{2E_e}{k}} = \frac{kx^2}{k}$$

$$2.2\text{J} = \frac{1}{2} 48 x^2$$

$$2.2\text{J} = 24 x^2$$

$$\sqrt{\frac{2(2.2\text{J})}{48\text{N/m}}} = x$$

$$0.3\text{m} = x$$

$$\textcircled{40} F = 18\text{N}$$

$$F = kx$$

$$x = 15\text{cm} = 0.15\text{m}$$

$$E_e = \frac{1}{2} k x^2$$

$$W = Fd$$